

**DE 42 01 031 C2**

Program selector system for automatic preselection of television or radio transmissions  
according to the individual interests of the subscriber

It<sup>1</sup> is known that viewers of television programs or listeners to radio programs only have the program previews broadcast by the respective transmitters, the printed overviews of programs in newspapers and periodicals and the overviews of programs via teletext or on-screen text available to them as an information base for the selection of individual transmissions.

In the field of digital broadcasting of radio programs a method has recently been used which merely enables the listener to display the classification of the currently broadcast transmission within one of a few broad categories (e.g. information, classical, entertainment, etc.) as a keyword in the display on the receiving device and only enables the immediate selection of these few broad categories. This is achieved for example by a method such as is described in DE 37 14 736 A1.

A circuit for selected reception of predetermined radio broadcasts is also known from DE 39 09 334 C2, in which the evaluation of a program preview is undertaken by comparison with the preceding program use behaviour (the so-called "evaluation profile") of the respective user.

It can be seen that the number of television and/or radio programs which can be received via antenna, cable and satellite etc. has increased greatly or will increase further and with it also the number of broadcasts offered. The overview of the totality of programs offered and the comprehensive selection of individually interesting broadcasts has become a time-consuming task, even if it can be achieved, for the listener or viewer. This leads to a situation where it is not possible for the user to obtain a quick overview of the broadcasts which are of interest to him at the particular time or in advance over a time period of several days, nor is it possible for him to avoid "missing" a broadcast of interest to him or additionally to arrange for

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<sup>1</sup> Start of column 1 of German text

broadcasts of interest to him out of all the programs offered to be recorded automatically and uninterruptedly on suitable recording devices.

The invention is based upon the problem that for the listener to radio broadcasts or the viewer of television broadcasts it requires a great deal of time to select from the abundance of programs offered the broadcasts which are potentially interesting to him.

This problem is solved by the features set out in Claim 1.

Previously known methods do not offer any solution to the problem:

Also the method known from DE 39 09 334 C2 of matching a program preview with the mean values of the previous user behaviour (denoted the "evaluation profile") appears to be of little advantage as it is based on expired broadcasts and new unknown broadcasts as well as a change in the user's interests are not taken into consideration. Moreover, this method operates by forming the mean values from the preceding user behaviour, which with regard to the selection of qualitative contents constitutes an unusable method of measurement for determining specific interests for specific contents. It appears equally problematic<sup>2</sup> to influence the selection of broadcasts via a desired value range generator.

The advantages which can be achieved with the invention reside in the fact that the subscriber can in a very short time obtain automatically for a defined time period in advance a detailed preselection based on his individual interests of the broadcasts offered in the broadcasting schedules (for radio and television) and can make a specific final selection in advance; furthermore, that he acquires a reliable possibility for ensuring that he does not overlook or "miss" any broadcast which interests him personally. Broadcasts which do not match one hundred percent with the subscriber's interests profile but are very close to the defined field of interest can also be incorporated into the overview by an advantageous selection and coding mechanism. Further advantageous embodiments of the invention are set out in Claims 2 to 5.

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<sup>2</sup> Start of column 2 of German text

The program selector system is divided into three parts: the transmission centre, the transmission of the encoded information by various transmission routes and the selector which the subscriber has.

In the transmission centre of the program selector system the detailed information concerning all broadcasts of radio and television broadcasters are assembled manually or automatically, formulated in brief descriptions and are classified and encoded both in terms of content and formally. In addition content details are produced in respect of each broadcast. The classification of the broadcasts is done hierarchically into main categories, sub-categories and detailed categories. In this case digital bit patterns are assigned to the various category levels. In the encoding a classification code is produced by the transmission centre for each individual broadcast and includes characteristic details such as e.g. content, authors, actors and year. The transmission of the classification code for each broadcast begins with the bit pattern of the main category which the bit patterns of the sub-categories follow hierarchically, so that upon reception an advantageous decoding and matching with the subscriber's interests profile can take place. The classification code, the formal transmission details (e.g. title, channel, transmission time) and the information texts for each broadcast are combined into one broadcast-specific information item so that with the aid of the information item each broadcast can be identified automatically in terms of content and formal aspects.

If for organisational reasons or because of changed wishes of the subscriber the classification code (introduction/alteration of categories) or the transmission details in general are to be modified, these changes of category are transferred by the transmission centre to the selector as reprogramming via the defined transmission route.

The encoded information items as well as the interests questionnaire can be transferred to the subscriber by the following transmission routes:

The transfer of the information item is made either by the piggyback method (e.g. in the blanking interval, by teletext, videodat) together with the transmission of radio or television

programs (e.g. via terrestrial broadcast, cable or satellite) or via a total transmission channel outside the transmission time<sup>3</sup> (e.g. at night time).

Alternatively the transfer of the information items can also be polled actively by the subscriber or automatically by the selector via an electronic data service (e.g. via on-screen text, e-mail). The information items can also be transferred to the subscriber in the form of item packets by means of material data carriers (print with barcodes or electronic storage media such as e.g. diskettes) by post or through the trade; the item packets are then read into a selector by the subscriber.

The transfer can be made by the transmission centre in encrypted form in order to control access to the program selector system. In this case in order to ensure against unauthorised access a short-term alternation of the encryption code can be achieved, e.g. by the use of smart cards.

In the selector which is set up at the subscriber's home as an add-on device to radio, television and recording devices or is integrated directly into these devices, the broadcasts of interest to the subscriber and appertaining information are automatically pre-selected from the totality of the programs offered on the basis of the information items transferred by the transmission centre. This takes place by way of the following individual functions:

On the basis of an interests questionnaire a personal interests profile is produced once for a service period. The interests profile is produced in the selector by means of an interactive dialogue between subscriber and selector in which the interests questionnaire transferred by the central transmitter via the defined transmission route to the selector is retrieved by the subscriber via one of the presentation media (e.g. screen, LCD display, in printed form) and answered by means of an input medium (e.g. alphanumeric keypad, remote control, light pen, barcode reader), whereby the answering of each individual interests question in menu form and multiple-choice technique in the selector causes a defined answer-specific bit pattern to be stored, so that for each subscriber an individual combination of several different bit patterns is produced which correspond in structure to the classification code of the program

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<sup>3</sup> Start of column 3 of German text

data and represent the individual interests profile of the subscriber which can be protected with a personal code word in the case of several subscribers per selector. Furthermore the interests questionnaire makes it possible for the subscriber to respond by means of menus at a different level of specificity so that he can determine the specification of his interests himself; this results in a more or less specific preselection of the broadcasts.

The information items obtained via one of the transmission routes from the transmission centre are successively technically decoded in the selector and the classification code of each broadcast-specific information item is automatically compared with the subscriber's interests profile. This comparison can be carried out successively for the interests profiles of several subscribers (e.g. family members). In this case it is particularly advantageous that the classification into categories has been carried out and each category level has been encoded by a specific bit pattern, since this makes it possible for the comparison with the subscriber's interests profile to be restricted for example to the main categories in dependence upon a previous setting, so that broadcasts with related content are also found.<sup>4</sup>

In this comparison process only those information items whose classification code coincides with a bit patterns of the interests profile previously stored in the selector are transferred in each case to the digital memory of the selector. The information items stored in this way in the selector can then be updated according to the cyclical transfer of new information items to the subscriber from the transmission centre; on the other hand the information items which are no longer current are automatically deleted.

The information items stored for the subscriber in the selector which contain the formal transmission details and information texts for pre-selected broadcasts can be retrieved by the subscriber on one of the defined presentation media individually or combined in groups (e.g. by content, by time or channel-based groups) and edited, i.e. he can delete or confirm pre-selected broadcasts, can mark them for automatic recording or for other control functions or can print out his individual program plan, depending upon the technical equipment.

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<sup>4</sup> *Start of column 4 of German text*

The use of the control functions makes it possible for the subscriber to be notified of marked broadcasts from his personal program plan by the selector by means of optical or acoustic signals shortly before the start of a broadcast; the notification can optionally also take place by inlaying of the title and program location of the selected broadcast into the currently running television program via the television screen.

The broadcasts marked by the subscriber for recording are recorded by automatic control of the recording device, whereby VPS data can be included in the control.

The control functions can be implemented currently or for a freely defined time period in advance which is limited by the extent to which the information items have already been transferred by the transmission centre and stored in the selector.

An embodiment of the invention is shown in the drawing.

Figure 1 shows the individual components of the selector and their functional relation. The subscriber's selector (10) is an essential component of the overall selector system. The selector consists of a microprocessor (3) with memory (4) as well as input and output units.

In the selector initialisation phase the personal interests profile for the respective subscriber is produced in an interactive dialogue of the subscriber with the selector by answering a catalogue of questions – possibly supplemented by inputs of keywords. Technically this dialogue runs from the subscriber via the input keyboard (9) to the microprocessor (3) and from there back via the screen controller (6) to the television appliance (8). The resulting interests profile (combination of the bit patterns for each individual answer) is stored in the memory (4) as reference for the later selection of broadcasts of personal interest.

In this embodiment it is assumed that the transmission of the encoded information takes place by means of the videodat process via a normal television channel at a fixed time of night. It is further assumed that the selector is integrated into<sup>5</sup> a television appliance (8) in such a way that the built-in tuner (1) of the television appliance (10) is used with it and the prepared

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<sup>5</sup> Start of column 5 of German text

FBAS signal is delivered to the selector. An automatic means is integrated into the television appliance (10) which at a programmed time of night automatically sets the tuner (1) to a predetermined program location and activates the selector.

The FBAS signal is first of all delivered from the tuner (1) to the videodat decoder (2), where the encrypted information transmitted in the first lines of each television picture are retrieved and are transmitted in prepared digital form to the microprocessor (3). In the microprocessor (3) this information is debugged of any transmission errors by means of a forward correction process.

The information items are characterised by the classification codes. In the microprocessor (3) the classification codes are compared with the subscriber's individual interests profile previously determined by the electronic catalogue of questions and stored in the memory (4).

If it is established that the received classification code of an information item coincides with a bit pattern from the stored bit pattern combination of the interests profile, then the information item (classification code, subsequent formal transmission details and information texts for the transmission) are taken up into the memory (4); correspondingly codings which do not coincide with the stored interests profile are not taken up into the memory (4). This process is repeated until the information items for a complete transmission period have been transferred and the pre-selected individual program plan for a pre-defined time period is present in the memory.

Then by means of the input keyboard (9) the subscriber can cause the selector to play the pre-selected program plan via the screen controller (6) on the connected television appliance (8) so that he can carry out the described editing functions.

If the selector is then set to timer mode the microprocessor (3) continuously carries out a comparison between the start time (clock time and date) of each broadcast which is stored in the memory (4) and the time and date given by the digital clock (6). As soon as a coincidence between the start time of a broadcast and the current clock time occurs, then depending upon the control function for which the broadcast was marked in the editing phase,

the microprocessor (3) effects the presentation of an acoustic or optical signal via a control line of the connected television appliance (8) or optionally effects the inlaying of the appertaining transmission details (title, program location) into the currently running television picture on the television appliance (8) via the screen controller (6). If during editing the relevant broadcast was marked by the subscriber for recording and a videocassette recorder (VCR) (7) has been put on stand-by, the microprocessor (3) causes this via the control line to record the corresponding broadcast. The video recorder is switched off automatically by a comparison of the stored end time of the respective broadcast with the built-in digital clock (6). Irrespective of the use of these functions it is possible for the information item stored in the selector for each pre-selected broadcast to be retrieved by the subscriber on the television appliance. Equally<sup>6</sup>, in the microprocessor (3) each information item from the memory (4) is continuously checked by comparison with the built-in digital clock (5) and as soon as it has "expired" it is deleted from the memory (4).

The invention is not limited to the embodiment set out above. On the contrary, a number of variants are conceivable which make use of the described solution even in constructions of a fundamentally different type. In particular the invention is not limited to implementation with programd logic, e.g. using a microprocessor, but can also be implemented with discrete logical components.

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<sup>6</sup> Start of column 6 of German text

## Claims

1. A program selector system consisting of the three components: transmission centre, transmission routes and subscriber selector for automated preselection of television or radio broadcasts according to the individual interests of the subscriber which goes beyond the usual broadly classified program overviews to facilitate automated program preselection and production of a program overview according to the differentiated individual interests of the subscriber, wherein in a selector which is located at the subscriber's home and is set up as an additional device to radio, television and recording devices or is directly integrated therein the differentiated program information (information elements) assembled by the transmission centre for a relatively long period of time and then transmitted is compared with the interests profile previously stored in the selector by the user and present as a bit pattern and is transferred to a digital memory if it coincides with the said interests profile and is offered to the subscriber for presentation and editing and initiates control functions so long as the start of a broadcast selected by the subscriber has been detected, characterised in that the program data received from the transmission centre are transferred from the buffer memory into the microprocessor (3) where a comparison is carried out with the classification codes taken from the interests profile memory (4), the comparison procedure is implemented by bit-by-bit comparison of the individual category levels of the classification code with the differentiated interests profile input by the subscriber, and the microprocessor (3) determines the level of detail at which the comparison takes place, i.e. the sub-category up to which the comparison is carried out, the classification code for each individual broadcast of all the programs offered within a defined time period is transmitted to the subscriber by the transmission centre in one information data element (information item), the information data element contains, firstly a classification code based on categories of interests, secondly formal transmission details, and thirdly information texts concerning the respective broadcast, in an interactive dialogue between subscriber and selector the individual interests profile is produced in the selector and stored for each subscriber in the form of an individual bit pattern

combination which is protected by a personally defined code word against retrieval<sup>7</sup> by others and which can be changed or deleted at any time by the subscriber by resumption of the dialogue, wherein one selector can serve a plurality of subscribers.

2. Program selector system as claimed in Claim 1, characterised in that for the production of the individual interests profile of the subscriber an interests questionnaire sent by the transmission centre via one of the defined transmission routes to the selector can be retrieved by the subscriber via one of the suitable presentation media (e.g. screen, LCD display) or alternatively can be obtained through the trade or by post as a paper document with barcodes, and this questionnaire is then answered by the subscriber by means of a suitable input medium (e.g. alphanumeric keyboard, remote control, light pen, barcode reader), whereby the answering of each individual question in the selector causes a defined answer-specific bit pattern to be stored, so that an individual combination of several different bit patterns is produced representing the interests profile which in the case of several subscribers per selector can be characterised for retrieval and protected by input of a personal code word.

3. Program selector system as claimed in Claim 1, characterised in that the information items and the interests questionnaire as well as other control information can be transferred in encrypted and encoded form to the subscriber's selector by the transmission routes of the television or radio programs, either by the piggyback method (e.g. in the blanking interval, by teletext, videodat) together with the transmission of radio or television programs or via a total transmission channel outside the transmission time or alternatively the information items can be actively acquired by the subscriber on material data carriers or via electronic data services (e.g. BTX, e-mail) or in the latter case can be retrieved automatically by the selector.

4. Program selector system as claimed in Claim 1, characterised in that the information items (classification code, transmission details, information texts) stored or pre-selected in the selector on the basis of the coincidence between classification code and bit pattern of his interests profile can be retrieved by the subscriber on one of the defined presentation media individually or in categories (e.g. by content, by time or channel-based groups), can be

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<sup>7</sup> Start of column 7 of German text

deleted or marked for control of a recording system or for other functions, wherein these other functions can reside in the fact that the subscriber is notified for example of marked broadcasts from his personal program plan by the selector by means of optical or acoustic signals, and wherein the notification can optionally also take place by inlaying of the title and program location of the broadcast into the currently running television program via the television screen.

5. Program selector system as claimed in Claim 1, characterised in that broadcasts marked by the subscriber for recording are recorded automatically on the attached recording devices taking account of VPS data, the recording devices being controlled via data lines or other transmission routes.

FIGURE 1

